FIG. 1
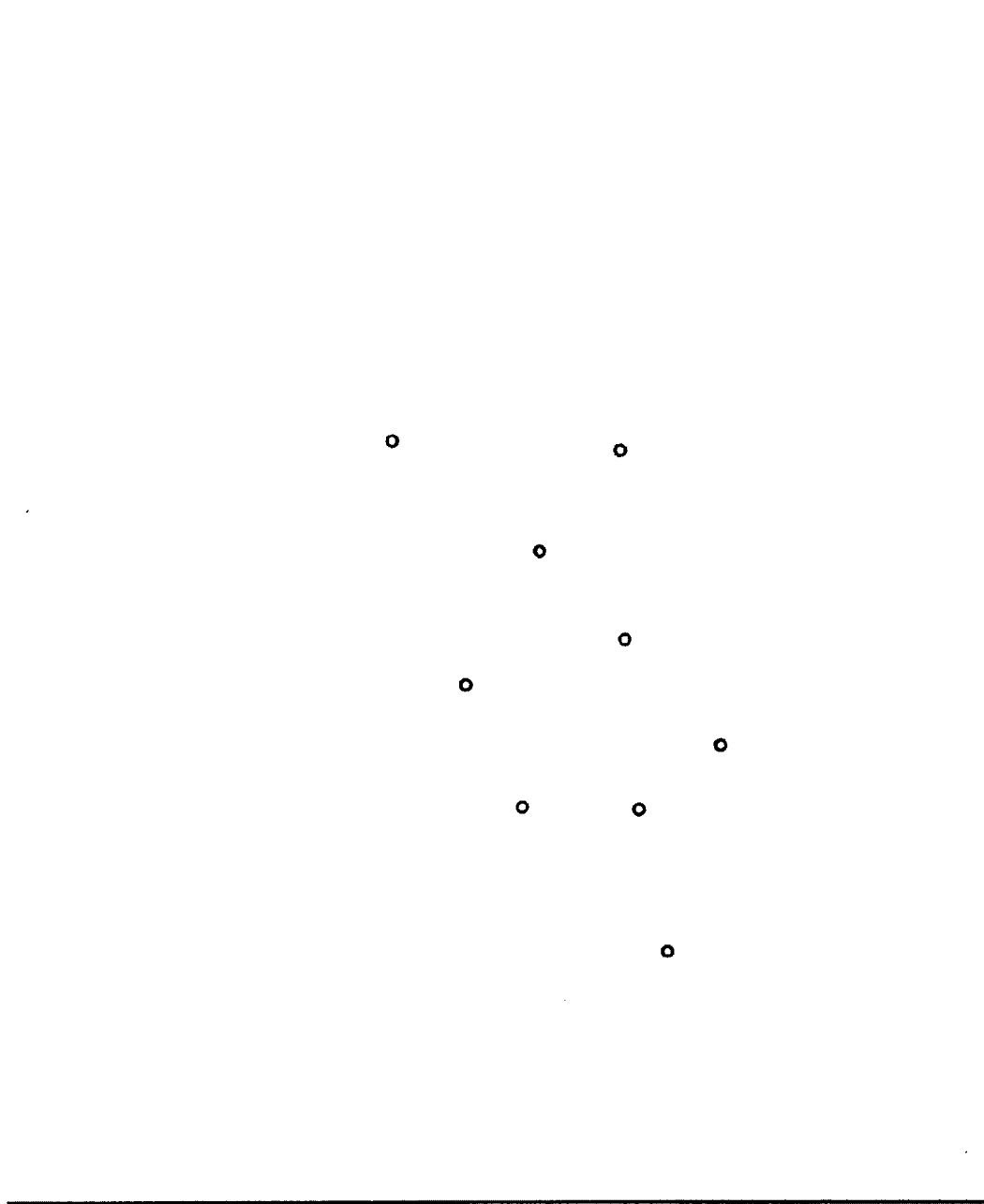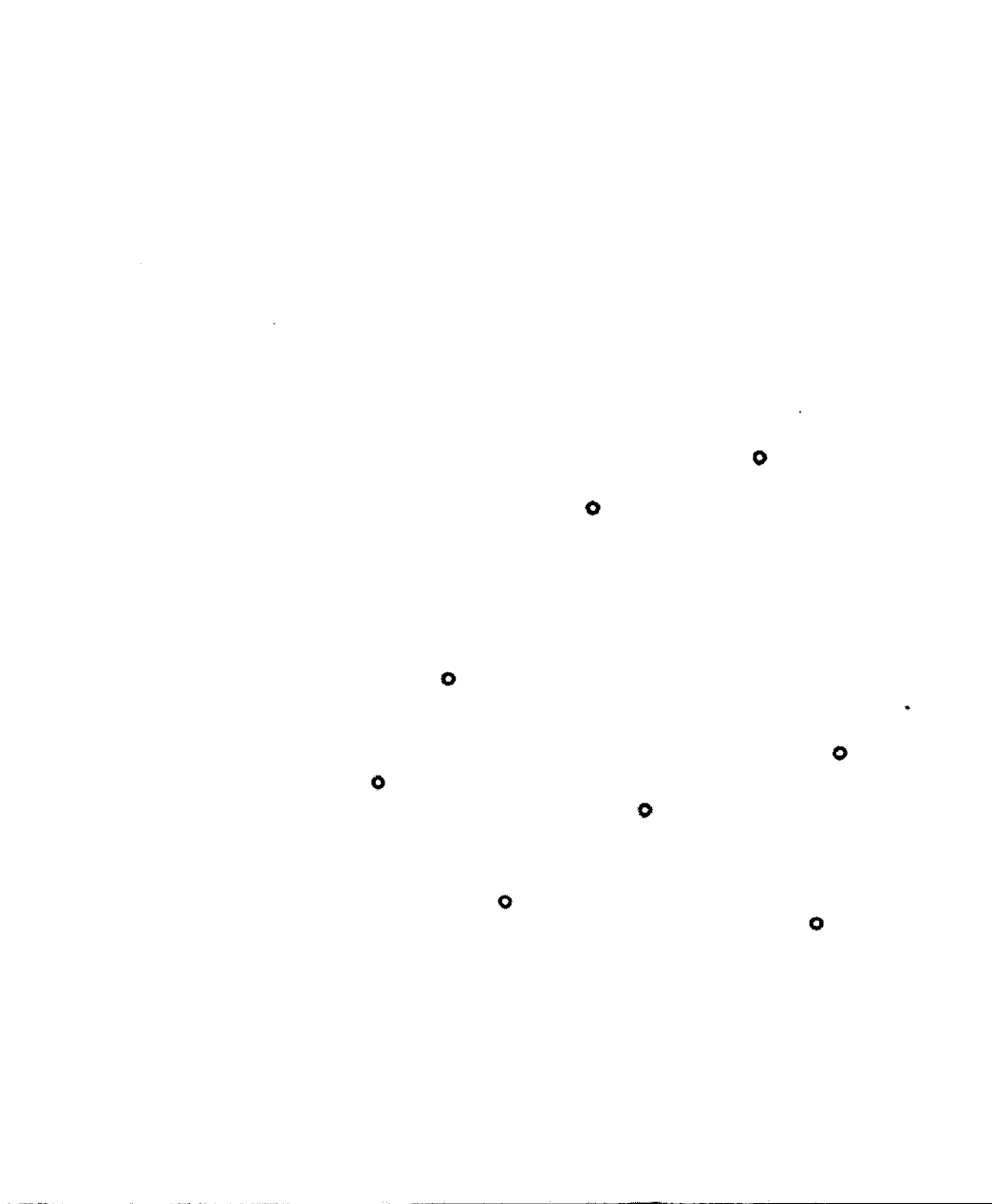
FIG. 2

FIG. 3

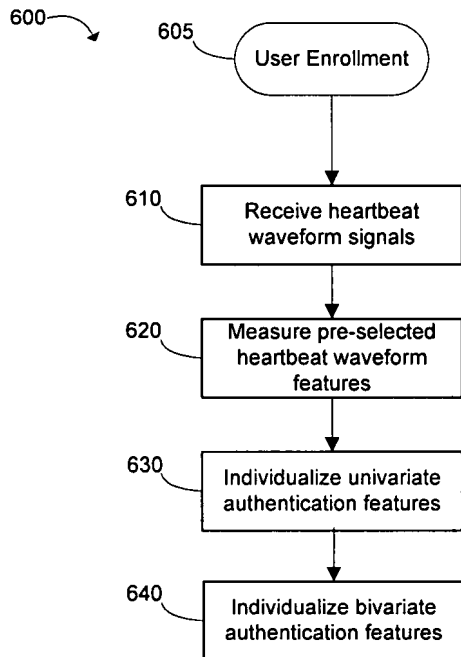## TABLE A

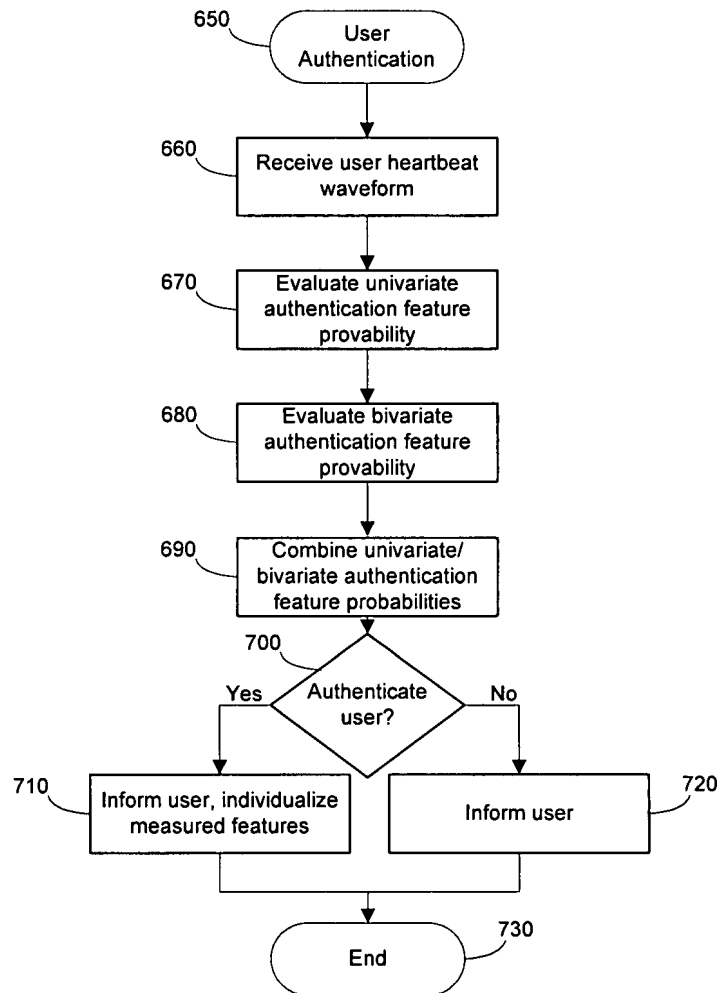| Features of Heartbeat Wave Form |
|---|
| Rate of change (slope) at all locations of the wave form. (There are n-1 of these per wave form. n= number of data points) |
| Shape of Peak associated with the strongest wave form feature |
| Shape of Peak associated with the dicrotic notch |
| Shape of Inverted Peak associated with dicrotic notch |
| Approach angle of Peak associated with the strongest wave form feature |
| Approach angle of Peak associated with the dicrotic notch |
| Approach angle of Inverted Peak associated with the strongest wave form feature |
| Approach angle of Inverted Peak associated with the dicrotic notch |
| Location of Peak associated with the strongest wave form feature |
| Relative location of Peak associated with the strongest wave form feature |
| Location of Peak associated with the dicrotic notch |
| Relative location of Peak associated with the dicrotic notch |
| Location of Inverted Peak associated with the dicrotic notch |
| Relative location of Inverted Peak associated with the dicrotic notch |
| Magnitude of Peak associated with the strongest wave form feature |
| Magnitude of Peak associated with dicrotic notch |
| Magnitude of Inverted Peak associated with dicrotic notch |
| Maximum rates of change along any defined segment of the wave form |
| Minimum rates of change along any defined segment of the wave form |
| Relative location associated with maximum rates of change along any defined segments of the wave form |
| Relative location associated with minimum rates of change along any defined segments of the wave form |
| Magnitude associated with maximum rates of change along a defined segment of the wave form |
| Magnitude associated with minimum rates of change along any defined segment of the wave form |
| Frequency of the wave form as determined by any data point |

FIG. 4

Features of Heartbeat Wave Form
Frequency of wave form as determined by a combination of data points
Trend measures associated with a feature
Trend measures associated with any segment and wave form
Cycles associated with any feature
Cycles associated with any segment of the wave form
Series associated with a feature
Series associated with a segment of the wave form
Variability estimates associated with features
Variability estimates associated with subsegments
Variability estimates associated with defined measures
Linear combination of features, segments, and data on a wave form
Non-linear combinations of features, segments, and data on a wave form

FIG. 5

600⟶

605 — (User Enrollment)

610 — | Receive heartbeat waveform signals |

620 — | Measure pre-selected heartbeat waveform features |

630 — | Individualize univariate authentication features |

640 — | Individualize bivariate authentication features |

Fig. 6a

650 — (User Authentication)

660 — | Receive user heartbeat waveform |

670 — | Evaluate univariate authentication feature provability |

680 — | Evaluate bivariate authentication feature provability |

690 — | Combine univariate/ bivariate authentication feature probabilities |

700 — ◇ Authenticate user?

Yes ⟶ 710 — | Inform user, individualize measured features |

No ⟶ | Inform user | — 720

(End) — 730

Fig. 6b